



# Carolina Skies

National Weather Service, Wilmington, NC

Summer 2004

## Hurricane Season

### **TROPICAL**

**DEPRESSION** - An organized system of persistent clouds and thunderstorms with a closed low level circulation and maximum sustained winds of 38 mph (33 knots) or less.

**TROPICAL STORM** - An organized system of strong thunderstorms with a well defined circulation and maximum sustained winds of 39 to 73 mph (34-63 knots).

**HURRICANE** - An intense tropical weather system with a well defined circulation and sustained winds of 74 mph (64 knots) or higher. In the western North Pacific, hurricanes are called typhoons, and similar storms in the Indian Ocean are called cyclones.

**STORM SURGE** - Storm surge is a large dome of water often 50 to 100 miles wide that sweeps across the coastline near where a hurricane makes landfall. The stronger the hurricane and the shallower the offshore water, the higher the surge will be. Along the immediate coast, storm surge is the greatest threat to life and property.

## **“Break the Grip of the Rip” Media Event, Wrightsville Beach, NC**

On May 24 WFO Wilmington, NC participated in the National Rip Current Media event held at Wrightsville Beach, NC. The focus of the event was the prevention of rip current related deaths. Speakers at the event included Vice Admiral Conrad Lautenbacher, Under Secretary of Commerce for Oceans and Atmosphere and NOAA administrator; Chris Brewster, president of the United States Lifesaving Association; Jim Lushine, WCM WFO Miami; Wendy Carey, Research Scientist Delaware Sea Grant; Sandee LaMotte, widow of CNN Correspondent and Bureau Chief Larry LaMotte who drowned June 8 while trying to rescue his 11-year-old son, and Peter Davis, Lifeguard and USLA Education Director. Also in attendance was General D.L. Johnson, NWS Administrator, and several staff from WFO Wilmington and NWS Headquarters.

The media event was very successful and demonstrated how partnerships between NOAA agencies and non government organizations can improve public safety at our Nation's beaches. The partners include NOAA Sea Grant, the NWS, the Wrightsville Beach Chamber of Commerce, and the United States Lifesaving Association.

After the media event several attendees, including General Johnson, visited WFO Wilmington. The General was given a briefing by MIC Mike Caropolo and a presentation on the Coastal Ocean Research and Monitoring Program (CORMP) by Dr. Marvin Moss, University of North Carolina at Wilmington Center for Marine Science. Also, Sandee LaMotte and her two children, Ryan and Krysta, were shown how rip current outlooks and Surf Zone Forecasts are prepared each day by the WFO, and how the NWS issues warnings and forecasts.

## **New Rip Current Awareness Information Available**

The NOAA (National Weather Service and Sea Grant) - United States Lifesaving Association Task Force has developed new safety information that is free to the public. This includes informative signs and brochures that illustrate what to do if a rip current is encountered. An online version of the rip current safety sign can be viewed at:

[http://www.ripcurrents.noaa.gov/resources/rip\\_current\\_sign.pdf](http://www.ripcurrents.noaa.gov/resources/rip_current_sign.pdf)

The online version of the rip current brochure can be seen at:

[http://www.ripcurrents.noaa.gov/resources/rip\\_brochure\\_final.pdf](http://www.ripcurrents.noaa.gov/resources/rip_brochure_final.pdf)

The rip current information can be reproduced by anyone to promote public safety. Currently, within the Carolinas, there are over 500 rip current signs installed at lifeguard stands and public beach access pathways. In particular, almost every beach access from North Topsail Beach to Fort Fisher, and all of the Grand Strand have rip current signs installed. The signs are particularly useful in those communities that do not have formal beach services and lifeguards.

## **Waterspout Forecasts Now Operational!**

Waterspouts are one of the many weather hazards faced by mariners along the North and South Carolina coasts. Most waterspouts occur between the months of May and August and can occur at any time of day.

A waterspout may look like a small tornado but the way in which it forms is very different. Tornadoes form in powerful thunderstorms where the winds blow at different speeds and directions through the height of the storm. This changing of the winds vertically is called wind shear. Unlike a true tornado, waterspouts most often develop on days when there is little wind shear.

You can get an idea of how much wind shear exists in the atmosphere by just watching the clouds. On a summer morning over the ocean there are usually tall puffy clouds called cumulus clouds. If these cumulus clouds grow straight upward, it is indicative of low wind shear. On the other hand if the cumulus clouds are tilted and seem to be leaning over as they grow, wind shear is strong that day and waterspouts are less likely.

Cumulus clouds form in areas where air is converging, or coming together at the surface. If a small swirl forms underneath a developing cumulus cloud, it can grow stronger as it is pulled and stretched up into the cloud. Occasionally if the wind shear is low enough, this swirl will grow strong enough to become a waterspout.

Waterspouts usually last for less than 20 minutes before dissipating. They often form in groups under the same mass of clouds and can have winds of up to 100 mph. More waterspouts occur in the Florida Keys than anywhere else on earth. In the past three years, more than two dozen waterspouts have been reported along the Carolina coast from Surf City to near Georgetown. Due to the vast size of the coastal waters it is likely the true number of

waterspouts was many times this.

The National Weather Service in Wilmington now includes a waterspout risk forecast twice a day as part of the Surf Zone Forecast. The waterspout risk can fall into one of four categories: none, low, moderate, and high. On days when there is light wind shear, plenty of moisture and good instability, the waterspout risk will be raised to moderate or high. This new forecast product will hopefully help mariners and beach-goers better plan their day.

The National Weather Service would love to hear reports of waterspouts, preferably in real-time as they happen! If you happen to see a waterspout please call the NWS office with your report immediately. If you're away from your phone or computer, we'd still like to hear your report anyway. Send all waterspout reports (and pictures if available) via email to Tim Armstrong at [Timothy.Armstrong@noaa.gov](mailto:Timothy.Armstrong@noaa.gov)

## **Surf Zone Forecast**

With summer upon us, the NWS would like to highlight a few new products that are being offered to the thousands of beach goers that visit the coastal Carolinas each season.

The Surf Zone Forecast is a text product that provides a wealth of weather information relevant to anyone planning a trip to the beach. It is organized into the following sections: Hazards, Weather, Surf and Tides. The “Hazards” section will provide the levels of risk for rip currents, cloud-to-ground lightning strikes, and waterspouts, as well as the daily UV index. The “Weather” section offers the sky conditions, chance of rain, high temperature, and wind forecast. Under “Surf” can be found the breaking wave height and approximate water temperature. Also provided are tide changes for Wrightsville, Holden and Myrtle Beaches. At the bottom of this product is a list of specific beaches in southeast North Carolina and northeast South Carolina, along with their corresponding rip current risk.

As a supplement to this text product, we have developed a set of hazard risk graphics which are provided via our website. A detailed map will indicate color-coded risk levels for the coastline between Surf City, NC and the South Santee River, SC. Just visit <http://www.erh.noaa.gov/ilm/beach> for more information.

## **Hurricane Season 2004**

The ingredients for a hurricane are:

1. An ocean warm enough to cause enough evaporation to generate a hurricane.
2. An environment of light winds so the developing hurricane doesn't get blown apart.

The Atlantic Ocean warms and cools slightly every few decades...and starting in 1995 it became warm enough for active hurricane seasons – the last nine years have had the most active nine consecutive hurricane seasons on record, even when 1997 (little activity) is included. Last year the tropical Atlantic Ocean was at near-record warmth, and it looks like this year it will be at least that warm – that means lots of evaporation and high potential for tropical cyclone development.

The other factor – light winds in the environment of hurricane development – is expected to be favorable for hurricane development as well. The El Nino-La Nina cycle of the tropical Pacific Ocean is neutral, causing little wind shear to inhibit Atlantic hurricane development.

August through October are the most active months of hurricane season, which runs from June through November. It is expected that above-normal hurricane activity will occur during this period, with a corresponding higher

likelihood of a land falling storm on the U.S. east coast.

The long term averages for Atlantic tropical cyclone activity are 10 tropical cyclones developing to tropical storm strength (at least 39 mph wind), and of those, six developing into hurricanes (at least 74 mph wind), and of those, two developing into major hurricanes of at least Category 3 strength. Last year there were 16 tropical storms, seven hurricanes, and three major hurricanes. It is expected that this hurricane season will be similar.

Last year hurricane Isabel developed into a Category 5 hurricane with winds around 160 mph while in the open Atlantic. It made landfall on the NC coast between Cape Lookout and Cape Hatteras as a Category 2 hurricane and moved up the east coast causing about \$3 billion in destruction from wind damage and storm surge, and 50 deaths were attributed to Isabel during the storm and afterward during the cleanup.

Hurricanes are becoming more expensive because there are more people with more property. While wind, falling trees and flying debris are a major threat, inland flooding is now the most significant hazard to life – almost  $\frac{3}{4}$  of all deaths are due to inland flooding from rain, especially from weakening, slow-moving remnants of

hurricanes.

For more information, see the National Weather Service Tropical Prediction Center website at:

<http://www.nhc.noaa.gov/>.

## **Bladen County is StormReady**

On July 12 Bladen County was recognized as StormReady at the County Commissioners meeting. Tom Matheson, Warning Coordination Meteorologist, presented a certificate and StormReady street signs.

"StormReady" encourages counties to take a new, proactive approach to improving local hazardous weather operations and public awareness," said Michael Caropolo, MIC, at the NWS Weather Forecast Office in Wilmington N.C. "North Carolina and Bladen County have a long history of severe weather and it is the goal of 'StormReady' to reduce the impact of severe weather in the state. The state experiences about a dozen weather-related fatalities per year and we are working hard to reduce that number."

The nationwide community preparedness program uses a grassroots approach to help organizations such as counties, cities, military installations, universities, or other community groups develop plans to handle local severe weather and flooding

threats. The program is voluntary, and provides communities with clear-cut advice from a partnership between the local NWS Weather Forecast Office and state and local emergency managers. "StormReady" started in 1999. There are now more than 740 "StormReady" communities in 47 states.

To be recognized as "StormReady," a county must:

- Establish a 24-hour warning point and emergency operations center
- Have more than one way to receive severe weather warnings and forecasts

### **AND to alert the public**

- Create a system that monitors weather conditions locally
- Promote the importance of public readiness through community seminars
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

## **Hurricane Inland/Freshwater Flooding**

All tropical cyclones can produce widespread torrential rains often in excess of six

inches. This rain can produce deadly and destructive floods. Heavy rain can trigger landslides and mud slides, especially in mountainous regions. Flooding is the major threat from tropical cyclones to people well inland.

Flash flooding, a rapid rise in water levels, can occur quickly due to intense rainfall. Longer term flooding on rivers and streams can persist for several days after the storm.

Intense rainfall is not directly related to the winds of tropical cyclones but rather to the speed of movement and geography of the area affected. Slower moving storms produce more rainfall. Mountainous terrain enhances rainfall from a tropical cyclone. Inland flooding can be a major threat to people hundreds of miles from the coast.

Tropical Storm Allison (2001) was the most costly tropical storm in U.S. history with more than \$5 billion in flood damage to southeast Texas and southern Louisiana. Twenty-three fatalities were reported in Texas and one in Louisiana.

Hurricane Floyd (1999) brought extremely heavy rainfall to many locations in the eastern United States. Of the 56 people who perished in this country during Floyd, 50 died from inland flooding,

including 35 in North Carolina.

Tropical Storm Alberto (1994) produced tremendous rainfall along the Gulf coasts of Alabama and Georgia, killing 33 people and producing damages exceeding \$750 million.

Hurricane Agnes (1972) fused with another storm system, producing floods in the Northeast United States which contributed to 122 deaths and \$6.4 billion in damage.

Hurricane Camille (1969) brought 27 inches of rain in Virginia, causing severe flash flooding and 150 deaths.

If you are asked to leave your home, do so IMMEDIATELY.

***Spring 2004 Monthly Climate Data  
Averages and Totals (Departures from Normal)***

<b><i>Wilmington, NC</i></b>	<b><i>March</i></b>	<b><i>April</i></b>	<b><i>May</i></b>
<b>Highest Temp</b>	<b>80</b>	<b>85</b>	<b>95</b>
<b>Average High</b>	<b>67.5</b>	<b>74.2</b>	<b>83.7</b>
<b>Average Temp</b>	<b>55.6 (+0.6)</b>	<b>63.4 (+0.7)</b>	<b>74.4 (+4.2)</b>
<b>Average Low</b>	<b>43.7</b>	<b>52.6</b>	<b>65.0</b>
<b>Lowest Temp</b>	<b>28</b>	<b>31</b>	<b>46</b>
<b>Precipitation</b>	<b>1.85 (-2.37)</b>	<b>1.35 (-1.59)</b>	<b>3.81 (-0.59)</b>

<b><i>N. Myrtle Beach, SC</i></b>	<b><i>March</i></b>	<b><i>April</i></b>	<b><i>May</i></b>
<b>Highest Temp</b>	<b>78</b>	<b>78</b>	<b>95</b>
<b>Average High</b>	<b>65.3</b>	<b>70.6</b>	<b>80.8</b>
<b>Average Temp</b>	<b>55.0 (+1.3)</b>	<b>61.4 (-0.6)</b>	<b>73.4 (+3.5)</b>

<b>Average Low</b>	<b>44.8</b>	<b>52.3</b>	<b>66.0</b>
<b>Lowest Temp</b>	<b>30</b>	<b>34</b>	<b>45</b>
<b>Precipitation</b>	<b>0.98</b> (-2.81)	<b>1.38</b> (-0.74)	<b>3.77</b> (+0.78)

*Florence, SC March April May*

<b>Highest Temp</b>	<b>81</b>	<b>87</b>	<b>95</b>
<b>Average High</b>	<b>70.2</b>	<b>77.0</b>	<b>86.4</b>
<b>Average Temp</b>	<b>57.0</b> (+1.2)	<b>63.5</b> (+0.5)	<b>75.0</b> (+4.0)
<b>Average Low</b>	<b>43.9</b>	<b>50.1</b>	<b>63.6</b>
<b>Lowest Temp</b>	<b>27</b>	<b>34</b>	<b>44</b>
<b>Precipitation</b>	<b>0.35</b> (-3.65)	<b>2.57</b> (-0.22)	<b>2.95</b> (-0.36)

*Lumberton, NC**March April May*

<b>Highest Temp</b>	<b>79</b>	<b>87</b>	<b>97</b>
<b>Average High</b>	<b>67.7</b>	<b>76.0</b>	<b>87.0</b>
<b>Average Temp</b>	<b>54.9</b> (+2.5)	<b>61.8</b> (+1.3)	<b>74.5</b> (+6.1)
<b>Average Low</b>	<b>42.1</b>	<b>47.6</b>	<b>61.9</b>
<b>Lowest Temp</b>	<b>24</b>	<b>28</b>	<b>41</b>
<b>Precipitation</b>	<b>0.42</b> (-3.89)	<b>2.72</b> (-0.11)	<b>2.38</b> (-1.59)